CLAIMS

We claim:

1. A process for making a biocompatible biodegradable fleece, the process comprising:

a. providing a solution comprising a crosslinkable synthetic macromer, the synthetic macromer comprising a polymeric hydrophilic region surrounded by two or more regions each comprising one or more moieties forming a biodegradable region and a crosslinkable moiety;

b. freezing the solution in a desired shape;

c. vacuum-drying the solution; and

d. crosslinking the crosslinkable macromer

to produce the fleece.

2. The process of claim 1 wherein the vacuum-drying step is performed before the crosslinking step.

3. The process of claim 1 wherein the vacuum-drying step is performed after the crosslinking step.

4. The process of claim 1 wherein the macromer solution further comprises at least one of a polymerization-causing material and a biologically active agent.

5. The process of claim 4 wherein the biologically active agent is selected from the group consisting of antibiotics, growth regulating molecules, hemostatic agents,

antibodies, antigens, transfection vectors, expression vectors, anesthetics, and anti-arrhythmic agents.

6. The process of claim 1, wherein the crosslinking is performed by the use of at least one of ionizing radiation, non-ionizing radiation, heat, addition of initiators, and addition of crosslinking chemicals or ions.

7. The process of claim 1, wherein the crosslinking is performed by a free radical polymerization reaction.

8. The process of claim 1 further comprising a rinsing of the crosslinked macromer.

9. The process of claim 8 further comprising the step of shredding the crosslinked macromer after rinsing.

10. The process of claim 1 further comprising the step of shredding the crosslinked macromer to form fleece particulates.

11. The process of claim 1 further comprising the step of shredding the crosslinked macromer after at least one of the freezing step and the vacuum-drying step.

12. The process of claim 1 wherein a supporting material is incorporated into the fleece.

13. The process of claim 12 where the incorporation of the supporting material occurs during the freezing step.

14. A biocompatible biodegradable fleece particulate produced by the process of claim 10.

15. The process of claim 10, further comprising the wetting of the fleece particulates with an aqueous solution.

16. The process of claim 15 further comprising the adding of at least one of a cell, a polymerization-causing material, and a biologically active agent to the wetted fleece particulates.

17. A biocompatible biodegradable fleece produced by the process of claim 1.

18. A biocompatible biodegradable fleece particulate produced by the process of claim 10.

19. A biocompatible biodegradable fleece particulate produced by the process of claim 16.

20. A biocompatible biodegradable fleece, wherein the fleece comprises crosslinked synthetic macromers, at least one of the synthetic macromers comprising a polymeric hydrophilic region surrounded by two or more regions each comprising one or more moieties forming a biodegradable region and a crosslinked moiety, and wherein the fleece is macroporous.

21. The fleece of claim 20, further comprised of at least one of a cell, a polymerization-causing material and a biologically active agent.

22. The fleece of claim 20 which is in the form of fleece particulates.

23. The fleece of claim 21 which is in the form of fleece particulates.

24. The fleece of claim 20, comprising a diacrylated polyethylene oxide comprising biodegradable linkages selected from the group consisting of monomers and oligomers of carbonates and hydroxyacids.

25. The fleece of claim 24, further comprised of at least one of a cell, a polymerization-causing material, and a biologically active agent.

26. The fleece of claim 24 which is in the form of fleece particulates.

27. The fleece of claim 25 which is in the form of fleece particulates.

28. The fleece of claim 20, wherein the fleece has at least two regions of differing composition.

29. The fleece of claim 1, wherein the crosslinkable macromer is water soluble.

30. The fleece of claim 1, wherein bubbles are incorporated into the solution before the freezing step.

31. A slurry comprising the biocompatible fleece particulates of claim 19 and an aqueous solution.

32. The slurry of claim 31, wherein the aqueous solution comprises at least one of a cell, a polymerization-causing material, and a biologically active agent.

33. A slurry comprising the biocompatible fleece particulates of claim 23 and an aqueous solution.

34. The slurry of claim 33, wherein the aqueous solution comprises at least one of a cell, a polymerization-causing material and a biologically active agent.

35. A slurry comprising the biocompatible fleece particulates of claim 27 and an aqueous solution.

36. The slurry of claim 35, wherein the aqueous solution comprises at least one of a cell, a polymerization-causing material, and a biologically active agent.

37. The method of treating a wound or defect by applying to the wound or defect the slurry of claim 31.

38. The method of treating a wound or defect by applying to the wound or defect the slurry of claim 33.

39. The method of treating a wound or defect by applying to the wound or defect the slurry of claim 35.

40. The method of claim 38 wherein the slurry comprises living cells.

41. The method of claim 40 wherein the defect is a chondral defect, and the living cells are chondrocytes.

42. The method of claim 41 further comprising applying a primer solution to the outer edges of the chondral defect, and applying a sealant to the primed area of the defect to seal the slurry to the defect.

43. The method of claim 42, wherein the sealant is applied as a biodegradable, polymerizable macromer, and the macromer is subsequently polymerized.

44. The method of claim 41 further comprising the step of applying a primer solution to the outer edges of the chondral defect, applying a sealant to the primed area of the defect to cover the chondral defect with the sealant, and then applying the slurry between the sealant and the defect.

45. The method of claim 44, wherein the sealant is applied as a biodegradable, polymerizable macromer, and the macromer is subsequently polymerized.

46. The method of claim 43, wherein the polymerization is performed by use of at least one of ionizing radiation, non-ionizing radiation, heat, addition of initiators, and addition of crosslinking chemicals or ions.

47. The method of claim 38 where the treatment comprises at least one of hemostasis, protection from the atmosphere, protection from drying, and delivering a cell or biologically active agent to the wound.

48. The use of the biocompatible biodegradable fleece of claim 20 for drug delivery.

49. The use of the biocompatible biodegradable fleece of claim 20 to prevent tissue adhesions.

50. The use of the biocompatible biodegradable fleece of claim 20 to culture cells and the subsequent implantation of the fleece with the cells to a defect.

51. The use of the biocompatible biodegradable fleece of claim 20 to provide a substrate for tissue engineering.

52. The method of treating a wound or defect by applying to the wound or defect a slurry comprising an aqueous solution and biocompatible fleece particulates of claim 27, which comprises cells selected from the group consisting of chondrocytes, cardiomyocytes, and stem cells.

53. The method of claim 52, wherein the stem cells are mesenchymal stem cells.

54. A slurry comprising an aqueous solution and biocompatible fleece particulates of claim 27, which comprises cells selected from the group consisting of chondrocytes, cardiomyocytes, and stem cells.